IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

LG DISPLAY CO., LTD., Plaintiff, v. AU OPTRONICS CORPORATION; AU OPTRONICS CORPORATION AMERICA; CHI, MEI OPTOELECTRONICS CORPORATION; and CHI MEI OPTOELECTRONICS USA, INC., Defendants.	C.A. No. 06-726-JJF **CONSOLIDATED CASES**
AU OPTRONICS CORPORATION, Plaintiff, v. LG DISPLAY CO., LTD. and LG DISPLAY AMERICA, INC., Defendants.	C.A. No. 07-357-JJF

AUO'S RESPONSE TO LGD'S CLAIM CONSTRUCTION BRIEFING ON AUO'S PATENTS

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I. U.S. PATENT NO. 6,976,781, "FRAME AND BEZEL STRUCTURE FOR BACKLIGHT UNIT"[1]

LGD takes issue with only two of AUO's proposed constructions for the '781 patent: LGD seeks to limit "hooks" as being "part of the frame structure itself"; and LGD argues that the claims must be limited to a process in which the frame and bezel are assembled simultaneously, in a single instant.

A. The "hooks" need not be "formed as a part of the frame component,"

LGD improperly attempts to limit the term "hooks" to protrusions that are "part of the frame." LGD argues that, because the figures of the patent depict the hooks as part of the frame (or bezel), the term "formed" in the claim term "hooks are formed to protrude outwardly" must be interpreted as "part of the frame component (from the same piece)." LGD Br. [D.I. 384] at 41.

The plain meaning of the claim language (*i.e.* "formed to protrude outwardly") does not support LGD's proposed construction. Indeed, in a similar situation, a district court has held that the plain meaning of the claim language "formed along an interior wall" does not require a tube to be part of the interior wall, despite the patent's specification clearly showing the tube as part of the interior wall. *Utah Med. Prods., Inc. v. Clinical Innovations Assocs., Inc.*, 79 F. Supp. 2d 1290, 1305 (D. Utah 1999), *aff'd*, 251 F.3d 171 (Fed. Cir. 2000). This is because the plain

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[1] Regrettably, the parties have been unable to agree on the application of Local Rule 7.1.3(a)(4) in this unique context – a multi-party consolidated action involving 23 patents, in which each party is both asserting and defending infringement claims. LGD has been adamant that it is entitled to file and intends to file two 40-page briefs. Whatever the proper construction of Local Rule 7.1.3(a)(4) might be in this circumstance, AUO respectfully submits that it cannot possibly provide that LGD is entitled to twice as many pages as AUO for its responsive Markman briefing. The Court's Oral Order of August 26, 2008 did not imply otherwise. Like LGD, AUO must respond to the separate arguments of two parties - LGD and CMO - regarding two separate sets of patents. Therefore, AUO is likewise filing two separate briefs of no more than 40 pages each.

meaning of "form," when used as a verb, is to "bring together parts to create." Supplemental Declaration of Julie M. Holloway ("Holloway Supp. Decl.") Ex. 47 (Compact Oxford Dictionary); *see also Utah Med. Prods.*, 79 F. Supp. 2d at 1305 (observing that "form," when used as a verb, is broadly defined as "to give a particular form or shape to; fashion in a particular manner"). Thus, according to this plain meaning, the hooks referred to in the '781 patent may be "formed" by bringing together the frame with a separate component. AUO's construction of the term "hooks" correctly captures this concept: "any protruding structure intended to be inserted into a hole for the purpose of fastening one element to another."[2] Contrary to LGD's assertions, this construction would not cover a screw that is fastened to the frame after the frame and bezel are assembled – the screw would not be a "protruding structure *intended* to be inserted into a hole," because it would not be protruding from the frame until *after* assembly.

LGD argues that the term "as said frame is mounted onto said bezel" requires that the hooks be part of the frame, otherwise the "hooks would be inserted and engaged at some point in time after the frame is mounted onto the bezel." LGD Br. at 42. Even if the disputed claim language limited the claimed apparatus to a "simultaneous" assembly process – and, as discussed below, it clearly does not – LGD's argument would make no sense. Hooks made from a different piece of material than the frame, such as welded metal tabs, could first be attached to the frame and then "simultaneously" inserted and engaged into corresponding holes in the bezel as the frame is mounted on the bezel. Thus, the supposed simultaneity requirement does not support LGD's overly-narrow construction of "hooks."

[2] Even under LGD's incorrect construction requiring the "hooks" to be part of the frame, a separate protruding structure, such as a spot welded metal protrusion, would be part of the frame once attached.

B. The apparatus claims cannot be limited to simultaneous assembly of the frame and bezel.

LGD argues for a construction of the term "as said frame is mounted onto said bezel" that would impose a "simultaneous requirement." LGD Br. at 43. As explained in AUO's opening brief, the references to "simultaneously" in the patent and prosecution history simply describe the configuration of the patented ***structure*** where both the first hooks are mated with first holes and the second hooks are mated with the second holes when the frame is mounted onto the bezel. AUO Br. [D.I. 378] at 4-5. LGD's proposed construction improperly attempts to read a process step—that the hooks are inserted and engaged in the holes at the ***exact same time*** the frame is mounted onto the bezel—into an apparatus claim. *Id.*

LGD did not brief, and has thus abandoned, its position on the term "bezel."

II. U.S. PATENT NO. 7,101,069, "DIRECT BACKLIGHT MODULE"

The '069 patent discloses an improved backlight support that simultaneously supports the diffuser and an illumination tube. The parties dispute the construction of the "fitting portion" and the "side walls" of that fitting portion. LGD seeks to limit the claims improperly in two respects. First, under LGD's construction, the illumination tube must fit into the fitting portion without any gaps, so as to be "held" – even though dependent claim 3 expressly requires a "gap" between the fitting portion and the illumination tube. Second, LGD seeks to limit the side walls of the fitting portion to vertical, or "upright," structures, as used in certain embodiments. This limitation would improperly exclude examples such as Figure 5E, below, in which the side walls of the fitting portion (hole 142) extend in a generally upward direction, but are certainly not "upright." LGD's proposed construction is also inconsistent with the dependent claims, where, for example, "the fitting portion of the support is a circular hole" (claim 1), which obviously would not have "upright" side walls. The "fitting portion" and its sidewalls must be construed broadly enough to include a circular structure. If

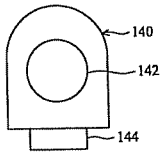


FIG. 5E

the Court believes that the term "side wall" should be construed, LGD's overly-narrow construction is improper. Construing a "side wall" as a part of the fitting portion, extending generally in an upward direction, would be consistent with the intrinsic evidence.

LGD argues that AUO's proposed construction of "fitting portion" as "accommodating" rather than "holding" the illumination tube would permit parts of two *separate* fitting portions to support the illumination tube and the diffuser. LGD Br. at 39. LGD is incorrect. According to the plain language of the claims, the "fitting portion" must have "two side walls extending upwardly and separately," between which an illumination tube may be disposed. AUO's proposed construction does not somehow insert a third sidewall, as LGD suggests.

LGD did not brief, and has thus abandoned, its position on the terms "comprises two side walls extending upwardly and separately" and "has two side walls extending upwardly and separately."

III. U.S. PATENT NO. 7,125,157, "BACKLIGHT UNIT"

LGD's argument focuses on constructions of the terms "a first supporting portion, disposed on the frame" and a "first constraining portion" that are unnecessary in light of limitations appearing elsewhere in the claims. LGD Br. at 44-46.

LGD argues at length that the first supporting portion cannot support the optical film when the frame is in a second position. However, the claims expressly include such a limitation: "when the frame is disposed in a second position…the first supporting portion *does not contact* the first constraining portion." '157 patent at claims 1, 16; *see also* LGD Br. at 44 (citing claims 1, 16). Thus, this is not the "main dispute," as LGD asserts – rather, it is whether LGD may improperly limit "supporting portions" to "projections." *See* AUO Br. at 7. LGD has not even attempted to justify this limitation.

Similarly, LGD complains that AUO's constructions of "first" and "second" "constraining portions" are inadequate because they do not specify which portion—the first or second—is doing the constraining in a given position. LGD Br. at 45-46. The claims, however, expressly state which portion is doing the constraining in a given position: "when the frame is disposed in a first position, the first supporting portion supports the first constraining portion…, and the second supporting portion does not contact the second constraining portion." *See, e.g.*, '157 patent at claim 16. Thus, LGD's complaints about AUO's constructions are unfounded.

LGD does nothing to justify adoption of its confusing construction of the term "constraining portion"—"a first passage through the film that has a gap in the gravity acting direction after receiving a supporting portion." For instance, LGD does not even attempt to explain (i) why a constraining portion is limited to a "passage through the film" when the specification expressly provides a constraining portion may be a hole ***or groove***; or (ii) why the "gap" limitation should be included when it is present only in ***dependent*** claims 9 and 18. *See* AUO Br. at 7-8.

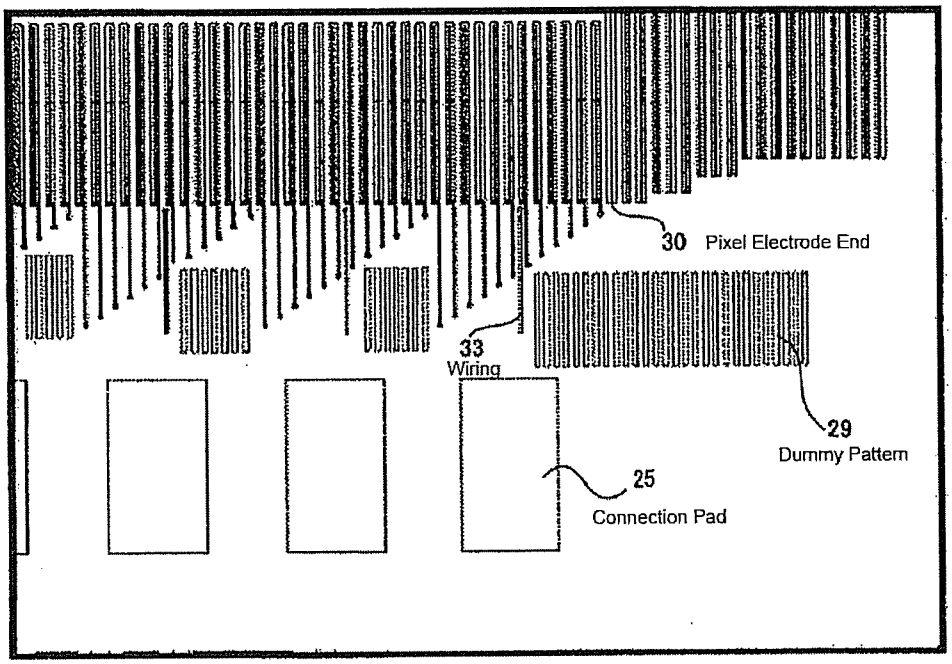
Lastly, LGD argues that when the frame is "disposed in a first position" the first supporting portion must be located near an upper edge of the frame. LGD Br. at 46. LGD – tacitly admitting that the claims do not impose such a limitation – relies entirely on the fact that the disclosed embodiments depict the supporting portions located near the upper edge. *See id.* Limiting claims to the disclosed embodiments, however, is improper unless the patentee has demonstrated a clear intention to limit the claim scope. *See, e.g.*, *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("[T]his court has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment."). LGD has not (and cannot) point to any such disavowal of claim scope. *See id.* at 909 ("[a]bsent a clear disclaimer of particular subject

matter, the fact that the inventor may have anticipated that the invention would be used in a particular way does not mean that the scope of the invention is limited to that context.") (internal quotations and citations omitted). Thus, LGD's proposed construction of the term "disposed in a first position" should be rejected. LGD's construction should further be rejected for the reasons set forth in AUO's opening brief, namely: (i) it uses the unnecessarily narrow term "projection" and (ii) it will not aid the jury in understanding the claims. *See* AUO Br. at 8.

LGD did not brief, and has thus abandoned, its position on the terms: "on opposite corners of the film," "on adjacent corners of the film," "disposed in a second position," and "does not contact."

IV. U.S. PATENT NO. 6,689,629, "ARRAY SUBSTRATE FOR DISPLAY"

The '629 patent describes using "dummy" conductive patterns formed, along with wiring and various other structures, on an insulating substrate; the dummy conductive patterns are "arranged in the ***portions***" of the insulating substrate where the "wiring density is low." '629 Patent at 6:38. These regions or "portions" are located "between the pixel electrodes and the connection pads," as shown in Figure 3, reproduced below (text labels added). *Id.* at 6:30-34. Adding the dummy patterns increases the density of material to be etched in such a region, preventing various problems that are caused by the low density. *Id.* at 5:29-38, 6:28-43.



A. The "area" is a specified region *of* the insulating substrate, not a layer of material *on* the insulating substrate.

The "area" of the insulating substrate layer refers to a specified region of the insulating substrate layer where dummy patterns are formed, to alleviate problems caused by the low density of material to be etched. This is clear from both the plain language of the claims, and from the descriptions in the specification. The claim as a whole requires that the "area" is a portion of "the insulating substrate," that wiring is "arranged on the insulating substrate," and that dummy conductive patterns are formed to comprise "at least about 30% of the area." The specification explains that there is a "***specified region*** where the dummy conductive patterns are formed" (6:4-6) and that preferably the "density of the dummy conductive patterns" is "30% or more on an area of a ***specified surface***" (5:55-61). As a person of ordinary skill in the art would understand, the term "area" in the claims thus refers to this "specified region" or specified surface of the underlying substrate layer. The specification repeatedly explains that dummy patterns are formed on "portions," "specified regions" or "specified surface[s]" of the substrate. '629 Patent at 5:55-58, 5:62-6:1, 6:4-6, 6:30-34, 6:38-40.

LGD, however, asserts that the "layer of an insulating substrate" refers, not to the layer of substrate material, but to the "necessary wiring and dummy pattern structures" that are formed ***on*** the insulating substrate. LGD Br. at 48. LGD never proposed this – or any – construction for the term "layer of an insulating substrate." *See* JCCS Ex. K-1, 2. In any case, LGD is incorrect, for at least two reasons. First, the "area" in the element "a layer of an insulating substrate, having an area" is referred to, later in the claim, as simply "the area of *the insulating substrate*." '629 Patent at 8:15-16. Therefore, a "layer of an insulating substrate" is simply "the insulating substrate," as the plain language of the term suggests. Second, LGD's construction ignores the plain language of the term itself. LGD is saying that a "layer of" substrate material means "a layer on" the substrate material, specifically wiring. This is like saying that "a layer ***of*** cake" refers, not to cake, but to a layer of icing that is placed ***on*** the cake. The "layer of an insulating substrate" simply refers to a layer or sheet ***of*** insulating substrate material, or, as stated later in the claim, "the insulating substrate." Layers that are formed "on" the substrate, such as the wiring, are expressly described as such. Claim 1 states that the "wiring [is] arranged ***on*** the insulating substrate," confirming that the wiring is distinct from, and located ***on***, the layer of substrate material. This is consistent with the specification, which repeatedly describes "wirings arranged ***on*** the insulating substrate." '629 Patent at 3:12-15, 3:31-35.

LGD then asserts that the "area" of the insulating substrate must be "material deposited and patterned on a substrate, such as glass, that covers part of the array substrate surface" – a construction with no relation whatsoever to the plain meaning of "area."[3] LGD Br. at 48. LGD further argues that this "area" must refer to the entire surface where wiring is formed anywhere

[3] LGD also asserts, without any substantive explanation, that the term "area" is indefinite. To the contrary, as discussed herein, "area" has a well-understood plain meaning and the specification uses this term consistent with that plain meaning.

on the substrate. LGD's rationale is that "the purpose of the invention is to achieve good wiring over the entire surface of the substrate," and "the specification discusses the desire to prevent interlayer shorts." *Id.* LGD argues that the "area" therefore cannot simply refer – as it plainly does – to a specified region where dummy patterns are formed. *Id.*

It is true that the invention seeks to achieve good wiring over the entire surface of the substrate. However, the ***problem*** that the invention addresses occurs only in specific regions of the substrate. In the prior art, good wiring was not formed over the entire surface of the substrate layer because of uneven etching in the "substrate ***region*** where the wiring density [was] lowered." '629 Patent at 2:9-12; *see also* 1:63-65. The problem occurred because "over etching . . . will be relatively increased" in areas where the density of material to be etched is low. *Id.* at 1:55-57. When "the etching rate is increased . . . the upper conductive material 4 is passivated not to be dissolved by the etchant . . . resulting in the occurrence of the undercut." *Id.* at 2:51-63; *see also id.* at 5:34-38. Therefore, "dummy conductive patterns are arranged in the ***portions*** where wiring density is low," thereby making it "possible to form wirings having good tapered shape as shown in FIG. 5C even in ***regions*** where the conductive material . . . tends to be passivated." *Id.* at 6:38-43. In other words, the dummy conductive patterns increase the density of material to be etched in specified regions where the metallization density is low, and thus prevent over-etching and passivation, which causes problems such as undercut. *Id.* at 2:51-62, 6:35-43. Each "area" where the dummy patterns will be formed is such a specified region. The problem to be solved, and the proposed solution, thus confirms that AUO's construction is correct, and mandates rejection of LGD's construction.

B. "Dummy patterns comprising at least about 30% of the area, the dummy patterns situated between the connection pads and the pixel electrodes"

The parties' dispute here turns on the construction of "area" and "layer of an insulating substrate," discussed above. Because the "area" is a region of the substrate, the "dummy patterns

comprising . . ." element requires the region to (a) have dummy patterns covering at least about 30% of the region, and (b) be located between the connection pads and the pixel electrodes. As LGD acknowledges, the density of material to be etched is low between the connection pads and the pixel electrodes. LGD Br. at 47. That is why the specified regions, where dummy patterns are formed, are situated between the connection pads and the pixel electrodes, as shown in Figure 3, reproduced above. '629 Patent at 5:29-35. These regions are relatively small. A person of ordinary skill in the art would understand that dummy wiring formed in these regions would not constitute 30% of the total wiring on the entire substrate, as LGD contends. Declaration of Aris K. Silzars ("Silzars Decl.") ¶ 11.

C. "Plurality of wiring arranged on the insulating substrate" cannot be part of the "layer of an insulating substrate."

LGD asserts that the wiring is "portions of" the "layer" – that is, the "layer of an insulating substrate" recited in the first claim element, and referred to as "the insulating substrate" in the sixth element. LGD Br. at 50. The claim does not say that the wiring is part of the "layer" – to the contrary, the claim expressly states that the wiring is "arranged on" the insulating substrate. AUO does not dispute that the wiring and the dummy patterns may be made of the same material. However, that material cannot be a layer of insulating substrate material – it must be conductive material, such as metal, formed ***on*** the insulating substrate.

D. Dummy patterns cannot be part of the "layer of an insulating substrate."

LGD asserts that the dummy patterns, like the wiring, are part of the "layer" and that they cannot receive or convey voltages or signals. To begin with, the dummy patterns are not "portions of the layer," as LGD asserts. The claim language does not say that the dummy patterns are part of the recited "layer." The dummy patterns cannot be part of the "layer" – as discussed above, the "layer" in question is the insulating substrate on which both the wiring and the dummy conductive patterns are formed.

AUO agrees with LGD that the dummy patterns do not convey signals, that the dummy patterns are "nonfunctioning," and that they are needed to "fulfill [a] prescribed condition." LGD Br. at 49. The condition, as the parties appear to agree, is to provide suitable metallization density during manufacturing – specifically, etching. Because the dummy patterns are "nonfunctioning," they do not conduct any signals that are used in the operation of the display, as proposed by AUO. This is not "adding" a limitation, as LGD asserts – it is simply explaining what "dummy" means. According to the plain language of the claims, the dummy patterns are not connected to the wirings that communicate with the transistors in the TFT array, so they ***cannot*** conduct signals that are used in the operation of the display. '629 Patent at 8:18-19, 8:62-63 (dummy patterns are not in contact with any of the wiring); Silzars Decl. ¶¶ 12-14.

AUO agrees that, because the dummy patterns do not conduct any signals that are used in the operation of the display, they could be removed after manufacture. '629 Patent at 6:52-55. It does not follow, however, as LGD asserts, that a dummy pattern could never receive any ***voltages***. The dummy patterns are not connected to any of the wirings that communicate with the TFT array or other component used to operate the display. Therefore, a voltage could be applied to a dummy pattern, or a dummy pattern could be connected to a ground terminal, without causing the dummy pattern to conduct any signal or perform any function. Silzars Decl. ¶¶ 13-15. A dummy pattern that increases the density of material to be etched so as to avoid wiring defects during manufacture, and performs no function in the operation of the display, would still be an infringing "dummy" pattern even if it were connected to a voltage source or ground. *Id.*

LGD did not brief, and has thus abandoned, its position on the terms "pixel electrode" and "each wiring."

V. U.S. PATENT NO. 6,778,160, "LIQUID-CRYSTAL DISPLAY"

The parties generally agree that the purpose of the invention is to improve the quality of the display for moving images. Liquid crystals have a relatively slow response time, so if an image is moving, the liquid crystal may not respond quickly enough to adequately display the changes in the image from one frame to the next.

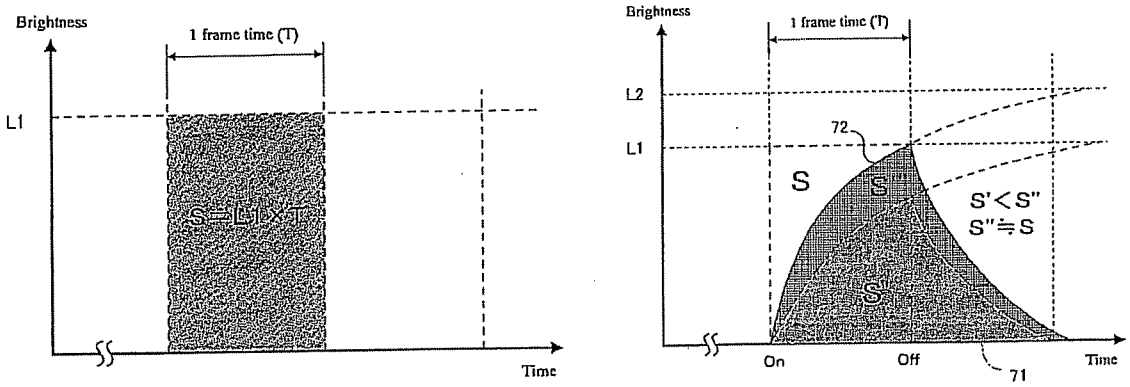
The inventors sought to make the actual response substantially equal, when perceived by the human eye, to the ideal response. The inventors recognized that the human eye perceives the total quantity of light emitted during the rise and fall response time. '160 Patent at 8:27-35; Figures 4 and 6 (reproduced below). This total quantity of light is the change in brightness, integrated over time. *Id.* Therefore, as LGD apparently agrees, the inventors sought to make the actual quantity of light emitted substantially equal to the ideal quantity of light. *Id.* at 8:45-47.

The parties disagree primarily because LGD is seeking to limit the invention to a specific kind of image: a wire-frame model. The wire-frame model is simply an example of an image which, when moving, exacerbates the problems that the inventors sought to solve. *Id.* at 2:15-20.

A. LGD seeks to limit "so as to make a time integration quantity of a brightness change substantially equal to an ideal quantity of light in a stationary state with respect to the next brightness level" to a wire-frame model input.

LGD complains, inaccurately, that AUO has failed to provide a construction for this term, and offers a construction of its own that is improperly limited to a single embodiment: a display that displays a "wire model." AUO offered constructions for the sub-parts of this term, including "time integration quantity of a brightness change," "substantially equal," and "ideal quantity of light in a stationary state." When these constructions, discussed below, are applied, this term requires a quantity of light, which is equal to the actual brightness level output by a liquid crystal summed over the rise and fall response time of the crystal, to be substantially equal to the quantity of light emitted by a pixel during one time increment when the pixel is non-changing,

i.e., stationary. In other words, the quantity of light which is actually emitted during the rise and fall response time of the liquid crystal is substantially equal to the quantity of light that would be emitted if the image was stationary and, thus, the pixel unchanging. The pixel is thus perceived, by the human eye, as providing a near-ideal quantity of light. This is precisely how the specification describes the invention. '160 Patent at 9:18-25 ("By overdriving . . . the quantity of light (S'') 72 can be obtained which is approximately the same as the quantity of light (S) which would be provided with the ideal response characteristic."); *see* Figures 4 (ideal response S) & 6 (overdrive response S" approximately equal to S).



The first part of LGD's proposed construction, "so that the quantity of light based on the actual response characteristic of the liquid crystal is substantially equal to the quantity of light based on the ideal response characteristic," is roughly correct, and consistent with AUO's proposed construction. The specification explains that the time integration of a brightness change is a quantity of light, at 4:53-55. The liquid crystal's brightness output changes over the response time of the liquid crystal, as shown in Figure 6. Thus, the "time integration of a brightness change" is the quantity of light actually output by the liquid crystal, S'' in Figure 6, and the "ideal quantity of light in a stationary state" is the quantity of light S that would result if the liquid crystal had an ideal response, such as when the image is stationary, in Figure 4. These quantities of light are made to be substantially equal, with respect to the next brightness level.

However, LGD has tacked on additional language, "when the liquid crystal cell is provided with the next brightness level during the next time increment and the previous brightness level before and after the next time increment." As explained above, the first part of LGD's construction interprets all the language of the term at issue, except for "with respect to the next brightness level." There is thus no "textual reference in the actual language of the claim" for the second part of LGD's construction. *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 990 (Fed. Cir. 1999). LGD's additional verbiage has no support in the claim language at issue, and improperly imports limitations from the "wire model" embodiment.

LGD seeks to justify its construction by arguing, incorrectly, that the lengthy term at issue has been defined by the specification. LGD points to three disparate passages in the specification, none of which purport to define the terms at issue. First, LGD asserts that the patent defines "a brightness change" as a "response characteristic depending on the types of liquid crystal cells." LGD Br. at 58. The cited passage, 4:50-56, is not a definition – it explains that brightness change will vary, depending on the type of liquid crystal cell. Brightness change is simply a change in brightness, and brightness is simply intensity of light. Holloway Decl. [D.I. 382 – filed in paper format] Ex. 22 at 109 (IEEE dictionary defining brightness as "attribute by which an area of color of finite size is perceived to emit . . . more or less light"). Then, LGD asserts that the patent defines "time integration quantity" as "a change in brightness in the moving-state video signal" at 5:16-22. Here, LGD has left out a key term – the passage describes "a time integration quantity which is a change in brightness in the moving – state video signal ***integrated with respect to time***."

Finally, LGD points to a description of "moving state brightness" as "the brightness when the particular pixel changes back to the off state one frame after it is driven from the off state to the on state during the passage of the wire-frame model over the particular pixel," at 5:66-6:03.

This passage is not a definition of "moving state brightness" – it describes the moving state brightness when a ***specific image*** – a moving wire-frame model – is to be displayed. '160 Patent at 5:51-54 ("In another category . . . an input wire-frame model is displayed") and 5:60-65 ("applying an offset . . . if the wire-frame model is in a moving state"). This moving wire-frame model is simply ***one example*** of a displayed image. '160 Patent at 2:16-37 ("When, ***for example***, a wire-frame model in a CAD application is displayed. . ."). When a moving wire model is displayed, pixels are turned all the way on and all the way off frequently. *Id.* A wire-frame model is therefore very difficult to display if the liquid crystal cell response is slow. *Id.*

Claim 1 is not limited to a wire-frame model input – the claim merely recites "inputting a video signal," and nothing in the specification suggests that the invention can ***only*** display wire-frame model inputs. An input wire-frame model is simply an example, described in the specification, of an image that is particularly prone to flicker, a problem addressed by the invention. *Id.* at 5:40-45. Claim 9, in contrast to claim 1, clearly is so limited – it expressly recites that "an input wire-frame model is displayed." It is the embodiment recited in Claim 9 and described at 5:50-6:4 that LGD improperly seeks to rely on to limit claim 1.

LGD argues, in a footnote, that if its construction, limiting the claims to the wire-frame model input, is not accepted, the claim must be indefinite. LGD argues that the specification does not describe what voltage would have to be applied when the brightness level changes from one "medium" (as opposed to "off") level to another "medium" (as opposed to "on") level.[4] To the contrary, the specification expressly describes, at 9:40-63, an example in which brightness may change from one "medium" level, such as 10, to another "medium" level, such as 20. Figure 7 is an exemplary table of brightness levels (not offsets) for each change in brightness

[4] LGD's assumption is incorrect: a wire model typically is, but need not be, limited to "on" and "off." '160 Patent at Figure 2, 7:47-49 (wire model brightness level varies from 0 to 100).

level from one medium level to another. The specification explains that the values in the table could be obtained by making measurements of the actual brightness provided in response to a desired brightness level, as shown in Figure 2. '160 Patent at 9:25-38, 10:14-25. The measurements would have to be made for each combination of previous brightness level and next brightness level shown in the table. *Id.* Thus, the patent explains how one could determine an output brightness level so as to obtain the desired brightness level for any change from one brightness level to another.

B. "Substantially equal" is an understandable term.

LGD argues that this term is either indefinite, or embraces the disclosed prior art. There is nothing indefinite about the term "substantially equal." "When a word of degree is used the district court must determine whether the patent's specification provides some standard for measuring that degree." *Seattle Box Co. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed Cir. 1984) (finding "substantially equal" is not indefinite). The specification of the '160 patent does so. The specification explains that "substantially equal" is a quantity that is not completely the same but can be accepted as a substantially equal level; the specification also explains that the purpose of the invention is to provide a quantity of light that is "approximately the same" or "almost the same" as the ideal quantity of light. '160 Patent at 9:19-23, 8:45-47.

LGD also asserts that AUO somehow "disclaimed" a meaning of "substantially equal" with respect to a prior art reference discussed in the background of the invention, JP 7-56532, at 2:4-12. AUO merely explained, at 2:4-12, that the reference in question discussed using an offset to improve response time, but described that offset only as "optimal." The reference's statement that an "optimal" offset should be used, without more information, is obviously not enabling. AUO's explanation is far from a "clear disclaimer" of providing a quantity of light that is "substantially equal" to the ideal quantity. *See, e.g.*, *Liebel-Flarsheim*, 358 F.3d at 906.

C. A "determinator for determining an output brightness level" is not limited to applying a "predetermined offset."

The parties generally agree that the "determinator for determining an output brightness level" is logic, such as circuitry, for determining an output brightness level. However, LGD improperly seeks to add a limitation from one of the embodiments described in the specification – that the determinator must "apply[] an offset that is predetermined based on a difference in the quantity of light between the actual and ideal response characteristics of the liquid crystal cell."

LGD can find no support in the claims for its construction. Claim 1 – unlike other claims – does not recite an "offset" (and *none* of the claims recite a "predetermined offset"). Claim 1 does not even require a table. Dependent claim 2 adds a "table for storing a brightness level," confirming, under the doctrine of claim differentiation, that claim 1 is not limited to a table – and claim 2, like claim 1, does not recite an "offset." In contrast, other claims, such as independent claim 4, do expressly recite an "offset." In support of its proposed construction, LGD points first to a passage at 4:61-67 that describes a particular embodiment, and that does not even use the term "offset," much less "predetermined offset." LGD then turns to a particular example –the wire-frame model input – and suggests that, because that embodiment mentions a "required offset" – which, of course, *is* required *for the embodiment* – that this passage, at 9:04-07, describes "the invention as a whole." LGD Br. at 60. Finally, LGD seeks to rely on a prosecution history excerpt which is neither a clear disclaimer nor an express definition of "determinator," and thus cannot limit the claims. *York Prods., Inc. v. Central Tractor Farm & Family Center*, 99 F.3d 1568, 1575 (Fed. Cir. 1996) ("a patent applicant only limits claims during prosecution by clearly disavowing claim coverage"). In short, LGD is simply attempting to import limitations from the specification into the claims. LGD's proposed construction should be rejected.

D. Brightness level

LGD asserts that "brightness level" is an electrical signal, and therefore must be limited to gray scale. On the contrary, as discussed in AUO's opening brief, gray scale is merely one way of ***representing*** brightness level within the system. Brightness level itself, as its plain meaning indicates and as the specification confirms, has to do with visual perception: "[b]rightness of a pixel to the human eye . . . should be considered in terms of the quantity of light, that is, a brightness change integrated with respect to time." '160 Patent at 8:31-35. As explained in describing the problem addressed by the invention, with a moving object, "the proper brightness cannot completely be achieved. That is, if a pixel is made [to] light up in only one frame, the brightness of the pixel may not reach the predetermined brightness . . ." *Id.* at 2:32-36. What the claim requires is that the pixel emit a quantity of light that is substantially equal to the quantity of light for a non-moving (ideal) image.

LGD argues that there are various types of color video signals, and that one uses gray scale while the other uses luminance. However, as the IEEE has affirmed, it is inaccurate to use the terms luminance and brightness interchangeably. Holloway Decl. Ex. 22 at 546-1. The specification does not define brightness level as gray scale. Rather, one passage identified by LGD, 4:42-47, states that "brightness level can be ***represented*** as a target brightness value by a gray scale." Another, 9:01-25, merely states that "a wire-frame model is drawn with an adequate gray scale," but does not define brightness level as gray scale. The other two passages, 5:15-21 and 5:55-6:06, and the abstract, merely discuss brightness level and do not mention gray scale.

The whole purpose of the invention is to adjust the brightness level of a pixel, and thus the quantity of light emitted by the pixel during the crystal rise and fall time. While the brightness level may be represented, within the system, by a gray scale, the brightness level itself

is the intensity of light as perceived by the human eye; brightness level, when integrated over time, thus yields a quantity of light. '160 Patent at 4:53-56, Figures 4 and 6.

E. "a storage for storing the previous brightness level of the video signal input through said input logic" and frame buffer.

LGD asserts that this element requires "temporary" storage and a "host," neither of which is recited in the element. These limitations therefore should not be inserted into the element.

As to "frame buffer," LGD's construction requires the frame buffer to hold an entire frame of image data. It is true that a "frame" comprises all the pixels that form one complete picture (1:43-45). However, it simply does not follow, as LGD asserts, that a "frame buffer" is required to store all the pixels for an entire frame at the same time. A "buffer" is simply temporary storage, and a frame buffer is merely required to store data for one or more pixels – or sub-pixels – of a frame – not all the pixels, and not all of them simultaneously. A "frame buffer" could store only a small part of a frame, and still perform the function required by claim 13: storing brightness information for an input pixel. LGD has pointed to no support in the specification for requiring the frame buffer to store an entire frame of image data.

LGD did not brief, and has thus abandoned, its position on the terms "video signal," "the next brightness level of the next video signal input to said input logic," "image displaying liquid crystal cell," "first brightness information for an input pixel," "pixel," "second brightness information for the next input pixel," and "an offset for making the time integration quantity of a brightness change substantially equal to an ideal light quantity which is the brightness in a stationary state to said second brightness information."

VI. U.S. PATENT NO. 7,090,506, "SIGNAL TRANSMISSION DEVICE HAVING FLEXIBLE PRINTED CIRCUIT BOARDS"

LGD asserts that, with respect to the "flexible printed circuit board" element, "[t]he dispute is whether the 'flexible printed circuit board' is *entirely* a flexible film with conductive

patterns printed on its surface," or may be "only *partly* on the flexible film." LGD Br. at 64 (emphasis in original). This point is not disputed. The flexible printed circuit board is a printed circuit that is printed on a flexible film, and not partially on flexible film and partially on, for example, a rigid board. AUO does not contend that the flexible printed circuit board may be a rigid or flex-rigid board.

Turning to "hot bar soldering" term, LGD's construction is overly-narrow for the reasons discussed in AUO's opening brief. Hot bar soldering does not require "pressure" beyond that which is necessary to hold the two items being soldered together; nor does it require melting solder at "multiple" contact points. AUO does not contend, as LGD suggests, that hot bar soldering literally encompasses standard soldering: applying a "hot ***bar***" to the "contact ***area***," as required by AUO's proposed construction, is not the same thing as applying a solder iron to an isolated point.

LGD did not brief, and has thus abandoned, its position on "display module" and "the first and second flexible printed circuit boards are joined by anisotropic conductive film (ACF) bonding."

VII. U.S. PATENT NO. 5,748,266, "COLOR FILTER, LIQUID CRYSTAL DISPLAY PANEL, LIQUID CRYSTAL DISPLAY, AND LIQUID CRYSTAL DISPLAY PANEL MANUFACTURING METHOD"

A. "Pillars of a color filter" need not be made of color filter material

LGD asserts that the recited "pillars" are "patterned structures of the color filter that protrude toward the pixel array beyond the height of non-pillar portions of the color filter substrate to act as a spacer." As an initial point, AUO does not dispute that the pillar acts as a spacer, and would not object to a construction of "pillar" as a "pillar-like spacer" or a "pillar that acts as a spacer." However, there are two fundamental disputes regarding the construction of the "pillar" element. One is whether LGD's unsupported construction of a "pillar" as "a patterned

structure" that protrudes toward the pixel array is at all useful to the finder of fact. The other is whether the "pillar of a color filter" recited in claim 9 must be *made of* color filter material.

As to the first dispute, a jury is perfectly capable of understanding what a "pillar" or "pillar-like spacer" is; the term "a patterned structure" is over-broad and, to a layperson, meaningless. As to the second dispute, nothing in the claim language requires the pillars to be "made of color filter material." Contrary to LGD's unsupported assertion, "pillars of a color filter" are not "***necessarily*** color filter pillars." LGD Br. at 52. Moreover, the specification repeatedly states that the invention includes "pillars of" or "on" a color filter – not pillars "made of" a color filter material. '266 Patent at Abstract, 4:65-67, 7:19-27. Furthermore, the specification illustrates the pillars as separate structures from the color filter (Figure 8, item 78). A pillar "of a color filter" thus simply refers to a pillar that is associated with a color filter.

The specification explains that it is "possible" to form a pillar using color filter materials, and that this avoids increasing the number of processes involved in manufacture. *Id.* at 5:57-61. However, it does not follow that the pillars of a color filter ***must*** be made from the same material as the color filter. Indeed, the specification states that a "laminate structure" can be formed on the opposite substrate to provide part of the pillar spacer, and "fine-adjust a cell gap" between the two substrates. *Id.* at 5:63-66. This confirms that there is no need for the pillars to be formed entirely, or in part, from color filter material. The purpose of the invention is to provide an improved spacer that is a fixed pillar rather than a sphere; the material used to make the spacer is of no particular importance.

B. "The pillars are covered with the common electrode" should have its plain meaning.

LGD asserts that this term means that "the common electrode is formed to cover the protruded surface of the pillars." LGD's proposed construction injects ambiguity, rather than adding clarity. What does it mean for the common electrode to cover "the protruded surface of

the pillars"? Does this construction mean that the electrode covers only the end of the pillar, the entire pillar, or something in between? In addition to being ambiguous, LGD's proposed construction is not supported by the intrinsic evidence that LGD has identified, indicating that, in various embodiments, the pillars electrically connect the common electrode with storage capacitance lines. This fact does not suggest anything about when or how the common electrode is formed, as LGD suggests. Nor does it have anything to do with the construction LGD proposes for "the pillars are covered with the common electrode."

The term "the pillars are covered with the common electrode" is understandable on its face, given AUO's construction of "common electrode" (which LGD evidently no longer disputes). AUO therefore proposes that this term be given its plain meaning. LGD's proffered construction of "the pillars are covered with the common electrode" is confusing, ambiguous, and unsupported by the intrinsic evidence; it should be rejected.

C. "Storage capacitance line for outputting the reference potential of the storage capacitance"/ "storage capacitance line"

LGD argues that "storage capacitance line" means "a pattern of electrically conductive material within the pixel area for providing a reference voltage to the storage capacitors." As discussed in AUO's opening brief, at page 22, there are three disputes regarding this claim term: whether "pattern of electrically conductive material" is a useful construction for "line"; whether "*outputting* the reference potential *of* the storage capacitance" means "*providing* a reference voltage *to* the storage capacitors"; and whether the intrinsic evidence requires the storage capacitance line to be "within the pixel area."

The intrinsic evidence relied on by LGD, a passage at 7:52-60, merely describes a single embodiment. This "third embodiment" connects the common electrode to a storage capacitor line, and, unlike other embodiments, does so indirectly instead of directly. The passage does not define storage capacitance line, does not say that the storage capacitance line provides a

reference voltage to the storage capacitors, and does not say that the storage capacitance line must be "within the pixel area." In short, it provides no support for LGD's position. LGD's proffered construction is confusing, contradicts the plain language of the claim, and is unsupported by the intrinsic evidence. It should be rejected.

LGD did not brief, and has thus abandoned, its position on "common electrode," "objects formed on the array substrate," "pillars being formed higher than other portions of the facing substrate," "common electrode for all pixels covering at least some of the pillars," "the common electrode being electrically connected to the storage capacitance line at the portions of the common electrode covering the pillars," "storage capacitance line for outputting the reference potential of the storage capacitance," and "injecting liquid crystal between the array substrate and the color filter substrate."

VIII. U.S. PATENT NO. 6,734,944, LIQUID CRYSTAL DISPLAY

A. Dynamic hardness value and plastic deformation hardness value are defined by well-known formulas and are not indefinite.

The '944 patent describes and claims spacers with physical characteristics – such as dynamic hardness value, plastic deformation hardness value, elastic coefficient, and linear expansion coefficient – which are defined by formulas and are required to be within certain specified ranges. Simply put, hardness is measured using an indentor tool, which is associated with a constant K. '944 Patent at 3:66-4:1, 7:27-30. To conduct the test, a load P is applied, and the depth h of the resulting indentation is measured.

Figure 1 shows a load vs displacement curve from the measurement process. Values of hardness (H), plastic hardness (PH) and Young's modulus (Y) were calculated according to the equations (1), (2) and (3), respectively, following the index of Elionix company that was modified from the method reported by Oliver and Pharr (1992):

$H=3.7926 \times 10^{-2} \times P_{max}/h_{max}^2$ (1)

$PH=3.7926 \times 10^{-2} \times P_{max}/h_l^2$ (2)

$Y=1.81092 \times 10^{-3} \times 1/h_l \times dp/dh$ (3)

in which P_{max} is the maximum applied load, h_{max} is the maximum penetration depth, h_l is the intercept depth and dP/dh is the contact stiffness from the unloading portion of the load vs displacement curve.

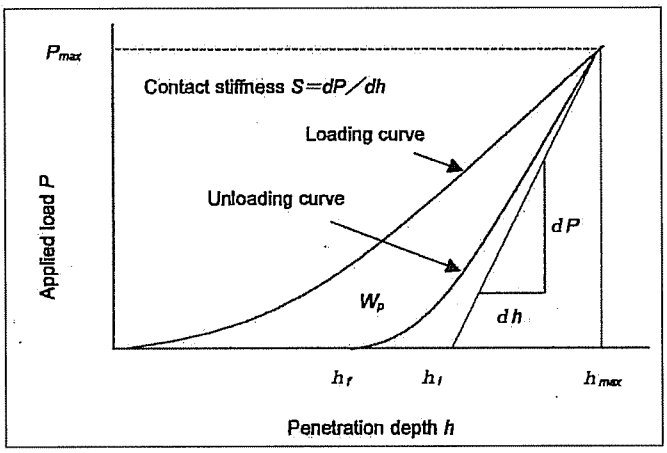


Figure 1. *Load vs displacement curve in the measurement process.*

The '944 patent defines the formula for dynamic hardness value, DH, as DH=K x P_{max}/h_{max}^2, where K is a constant value assigned to the indentor tool, P_{max} is the maximum load applied during the test, and h_{max}, is the total maximum variation obtained during the test, i.e., the maximum depth of the indentation that occurs when the load is applied, using the indentor tool. The '944 patent also defines the formula for plastic deformation hardness value, HV, as HV= K x P_{max}/h_r^2, where h_r is the variation when the tangent in the maximum variation point of an unloading curve has no load. These are well-known formulas used to measure hardness, as demonstrated by the above excerpt from Holloway Supp. Decl. Ex.48; *see also* Holloway Supp. Decl. Ex.49 (Hardness Evaluation of Polytetrafluoroethlene Products, ECNDT 2006 – Poster 111) at 1.

Nonetheless, LGD argues that the "dynamic hardness value" and "hardness value of plastic deformation" are indefinite because, according to LGD, certain variables in these formulas are not defined. LGD Br. at 55. In particular, LGD argues, without pointing to any support, that the formula must provide a value for maximum load, P_{max}, give the speed with which the indentor is applied to the spacers, and identify the underlying layer and/or substrate during the measurement. LGD is incorrect. First, there is no need to provide a value for the maximum load, P_{max}, that will be applied and measured during the test, because it may and

should vary from test to test. The hardness values, whether DH or PH, P_{max}, and the measured depths, whether h_{max} or h_r, are interrelated. That is, if the tester applies a greater maximum load, the measured depth will also be greater, and the resulting hardness value will be the same. See Holloway Supp. Decl. Ex.50 at 1 "The hardness is then expressed as the ratio of the load to the curved area of the indentation [...] or as the ratio of the load to the projected area of the indentation."). Second, "speed" is simply not a parameter in these tests. *See* Holloway Supp. Decl. Ex.50 at 1. "A hard steel ball is pressed under a fixed normal load on to the smooth surface of the metal to be tested. When equilibrium has been reached, the load and the indenter are removed, and the diameter of the permanent impression measured." Finally, the underlying layer and/or substrate during measurement is treated as a rigid surface to provide support for the specimen. It has no meaningful effect on the measurements at issue. *See id.*

B. The term "at least one of the group consisting of" is readily understood.

LGD also argues that the term "at least one of the group consisting of" is indefinite. According to LGD, the selected photosensitive resin must have at least one of five listed characteristics, two of which are not material characteristics, but rather design aspects of the resin spacer. A claim term is indefinite only if a person of ordinary skill in the art, considering all the intrinsic evidence, cannot understand what the term means. "If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds." *See Exxon Research & Eng'g Co. v. United States*, 265 F.3d 1371, 1375 (Fed. Cir. 2001). "By finding claims indefinite only if reasonable efforts at claim construction prove futile, we accord respect to the statutory presumption of patent validity . . . and we protect the inventive contribution of patentees, even when the drafting of their patents has been less than ideal." *Id.* The test for definiteness focuses on whether those skilled in the art

would understand the scope of the claim when the claim is read in light of the rest of the specification. *See id.*

A person of ordinary skill in the art would readily understand that the characteristic to be selected is a characteristic of the spacer made of photosensitive resin, and is not limited to characteristics of the resin itself. This is so for several reasons. First, the listed characteristics are spacer characteristics, and not merely material characteristics. This, alone, would inform a person of ordinary skill in the art that a spacer characteristic is being selected. Second, the claim expressly states that the photosensitive resin is "to regulate a cell gap between the first and second substrate." Obviously, merely describing the material characteristics of a resin cannot perform this function – a spacer made out of the resin is required. And, third, the focus of the specification is optimizing various characteristics of spacers, such as shape (3:40-42, 5:31-6:15) and occupancy ratio (4:56-5:30). It is thus not impossible, or even particularly difficult, to understand this term.

C. The term "the length of one side of the upper spacer surface" is definite as it is used in the patent

LGD also asserts that the term "the length of one side of the upper spacer surface" is indefinite because: 1) it is unclear which lengths and widths of the rectangular surface should be used for measurement, and 2) it requires multiplying the height of the spacer by an unspecified and varying constant below 1. LGD Br. at 56-57. LGD's argument ignores the claim language and the teachings of the patent. First, "the length of one side of the upper spacer surface" is used to compare to "the length of one side of the lower spacer surface." '944 Patent at claim 4. The meaningful parameter is the ratio between the lengths of the two surfaces. Therefore, it is immaterial which side of the rectangular surface should be measured, as it is always measured on the same side of both surfaces. In other words, the ratio between the lengths of the two surfaces remains the same no matter which side of the rectangular surface is measured. Second, the '944

patent clearly defines the constant C as 0.9: "[t]he above range of 50 to 90% is the value to be obtained when the ***constant C is set at 0.9***." '944 Patent at 6:13-14. The range of 50 to 90% is used in the claims as limit for the ratio between the lengths of two surfaces. A person of ordinary skill in the art would readily understand that constant C is 0.9.

LGD did not brief, and has thus abandoned, its position on "elastic coefficient."

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